

About X-Ray Amorphous Phase Formation of Ultradispersed Diamonds

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E. Petrov et al. (Lietuvos Fizikos Rinkiny, 1988, 28, N4, p.519-521, in Russian) had observed so-called "X-ray amorphous phase" of the detonation synthesis ultradispersed diamond (UDD) (right side of the fig. 1). The authors of this work connect formation of the phase with some absorption bands of 1105 and 625 cm⁻¹ in the infrared (IR) spectra of old UDD samples and interpret the phase from the molecular standpoint as gradual destruction of some types of UDD.

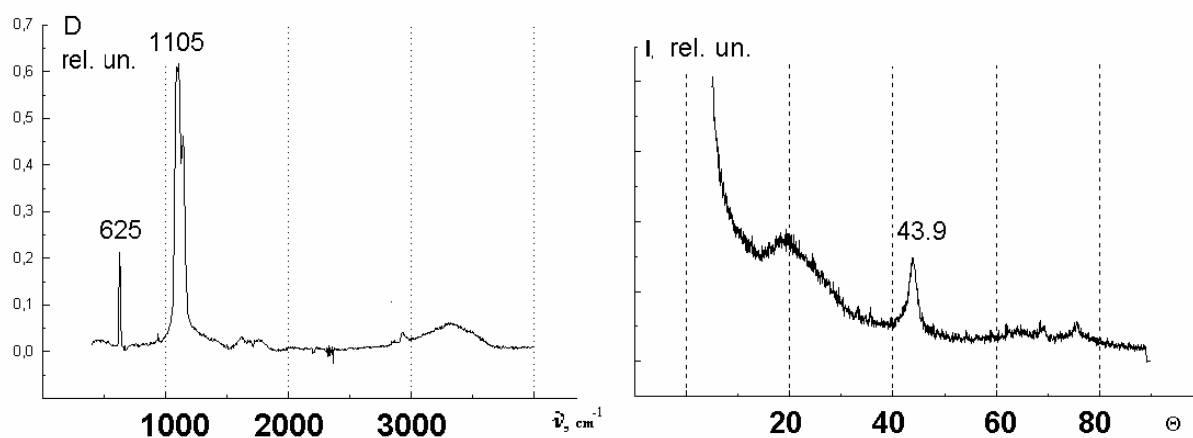


Fig.1 X-Ray amorphous phase (right), and some absorption bands (1105 and 625 cm⁻¹) of old UDD. These samples were obtained before 1984.

The discussion of the results allow to state that the important parameter characterizing the UDD structure is the nitrogen inclusions which with high probability have the high temperature origin. From the standpoint of the technological certification the authors make a conclusion that the informative parameter separating the fields of the UDD application is the nitrogen mass share in the UDD element composition (the level of 2.30 ± 0.15 mass. %). The UDD with the nitrogen content of less than 2.2% (class 1) can be applied in the fields where the principal parameter is the properties of the diamond nanograin. Class 2: the nitrogen portion is higher than 2.4%. The role of the functional groups becomes principal one and probability of the X-ray amorphous phase formation is high.